ABSTRACT

The invention disclosed a mixed-mode fuel injector with micro-variable-circular-orifice (MVCO), which is a fuel injection device for internal combustion engines, either diesel or gasoline engines. The fuel injector is a high-accuracy couple of components comprising a needle valve (1) and a nozzle body (5). Said needle valve is movable back and forth and received in said nozzle body to provide an opening position for fuel injection and a biased closing position. Said nozzle body has multiple-micro-channels (6) on the inner conical surface (C) close to the tip of the nozzle body. The injector has a MVCO (4) comprising a micro-variable-circular aperture and multiple-micro-channels, and has means of generating variable mixed-mode sprays of conical and multi-jet shapes, with a major homogeneous conical spray at low to medium injection loads.